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Characterization of Grand Fir Colonized by Nosodenron Californicum Horn (Coleoptera: Nosodendridae)

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CHARACTERIZATION OF GRAND FIR COLONIZED BY *NOSODENDRON CALIFORNICUM* HORN (COLEOPTERA: NOSODENDRIDAE)

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ABSTRACT

In two 50-hectare forested areas in a *Thuja plicata/Pachistima myrsinites* habitat type, 52 grand firs, *Abies grandis* (Douglas) Lindley, hosts of *Nosodendron californicum* Horn, were located. Trees colonized by *N. californicum* averaged 40.6 m in height, 115 years in age and 59.5 cm in diameter. Average elevation was 906.8 m.

In the Pacific Northwest of the United States, the wounded tree beetle, *Nosodendron californicum* Horn, colonizes slime fluxes of grand fir, *Abies grandis* (Douglas) Lindley, (Osborne and Kulhavy 1975), white fir, *A. concolor* (Gord. and Glend.) Lindley, (Hayes and Chu 1946), and Douglas-fir, *Pseudotsuga menziesii* (Mirb.) Franco, (Zack *et al.* 1979).

Although the association of *N. californicum* with slime fluxes is well documented (Sokoloff 1959, 1964; Osborne and Kulhavy 1975; Zack *et al.* 1979), little information is available on forest stand structure and frequency of host colonization.

Osborne and Kulhavy (1975) characterized grand fir colonized by *N. californicum* as 30-35 cm in diameter (at 1.4 m) and greater than 120 years of age in a mixed conifer stand dominated by old-growth grand fir and western red cedar, *Thuja plicata* Donn. Zack *et al.* (1979) characterized Douglas-fir colonized by *N. californicum* as "larger-than-average host trees."

The purpose of this study was to characterize host trees and the forest stand conditions associated with *N. californicum* in northern Idaho.

METHODS

In 1975, I examined slime fluxes of grand fir in two 50-hectare areas in the *Thuja plicata/Pachistima myrsinites* habitat type (h.t.) (Daubenmire and Daubenmire 1968). Area A, located 9 km SW of Elk River, Clearwater County, Idaho, on the Tired Wolf and Butterfield drainages, is in a xeric portion of the *T. plicata/P. myrsinites* h.t. There have been repeated entries into the stand to remove high value western white pine, *Pinus monticola* Douglas.

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The residual stand consists of overmature grand fir with pockets of *T. plicata* understory. Many of the grand fir are infected with the Indian paint fungus, *Echinodontium tinctorium* (Ell. and Ev.) Ell. and Ev. and have basal logging wound scars and frost cracks. Slime fluxes and ooze puddles from the slime flux runoff have formed at the base of the wounded grand fir and in logging wounds. The average elevation is 920 m with a south to southeast aspect.

Area B, located 7 km SSE of Elk River in the mesic portion of the *T. plicata/P. myrsinities* h.t., borders a fork of Oviatt Creek. The area is a cool air drainage with *T. plicata* as the major understory tree species. The overstory is dominated by overmature grand fir, western white pine, and remnant western larch (*Larix occidentalis* Nutt.), with Douglas-fir on the drier slopes. The area has no recent indications of logging or fire, and the tree crowns form a canopy-like cover of the forest floor. The majority of the dominant and codominant grand fir are infected with *E. tinctorium*. The average elevation is 895 m with a west to northwest slope. All dominant or codominant grand fir with frost cracks or wounds were examined for *N. californicum*. The height (m), diameter (cm at 1.4 m), age, and wound-bark thickness of each tree colonized by *N. californicum* were measured.

Table 1. Characteristics of grand fir colonized by Nosodendron californicum (mean ± standard deviation and range).

Variable	Area A (n = 26)	Area B (n = 26)	Area A and B combined (n = 52)
Height (m)	32.1 ± 5.4	49.0 ± 4.8	40.6 ± 9.9
Range	19.5 - 37.0	40.5 - 59.0	19.5 - 59.0
Age (at 1.4 m)	114.3 ± 26.9	115.8 ± 17.9	115.1 ± 22.6
Range	69 - 214	86 - 153	69 - 214
Diameter (cm at 1.4 m)	52.3 ± 13.3	66.6 ± 11.0	59.5 ± 14.1
Range	30.5 - 80.0	41.0 - 91.3	30.5 - 91.3
Wound bark thickness (mm)	24.3 ± 8.1	26.0 ± 6.8	25.1 ± 7.5
Range	9.0 - 45.0	11.0 - 36.0	9.0 - 45.0

Table 1. Characteristics of grand fir colonized by *Nosodendron californicum* (mean ± standard deviation and range).

Results and Discussion

Nosodendron californicum typically colonized slime fluxes of old-growth grand fir with frost cracks or logging wounds. Trees colonized averaged 40.6 m in height, 115.1 years in age, 59.5 cm in diameter and 25.1 mm wound bark thickness for both areas combined (Table 1).

Although there were 26 host trees located in each 50-hectare area (Table 1), total numbers of *N. californicum* adults and larvae were greater in Area B. Thirty-one percent of the host trees colonized in Area A had basal logging wounds as opposed to 12% in Area B.

In Area A, the xeric portion of the habitat type, *N. californicum* host trees were primarily along logging skid trails. Slime fluxes from these logging wounds were smaller in size than from frost cracks and judged a marginal habitat for *N. californicum*.

Area B is a cool air drainage with a canopy of overmature grand fir and cedar. The high incidence of disease in these old-growth grand fir, especially the Indian paint fungus, *E. tinctorium*, leads to the formation of frost cracks. The slime fluxes associated with these frost cracks supported large numbers of adults and larvae of *N. californicum*. Also, the run-off formed large ooze puddles at the base of the host tree. These ooze puddles and clay soil at the tree base are optimal conditions for overwintering *N. californicum* (Osborne and Kulhavy 1975).

The occurrence of 26 host trees for each 50-hectare area suggests that *N. californicum* is widely distributed on old-growth grand fir in the *T. plicata/P. myrsinites* habitat type of northern Idaho. Adults and larvae were most prevalent on frost cracks in the mesic zone (Area B) of the grand fir habitat. Frost cracks supported larger populations of *N. californicum* than did basal wounds caused from logging damage.

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EDITORIAL

Editorials are nice. They are the editor's reward. They are . . . unedited. This one is a distillation of some observations about collecting methods.

Jo and I share our house with termites. Last year, after a bout of alleged pest control, Jo found a fresh termite tube on our patio; she wanted action. I sprayed with a knockdown product, "Ortho Hornet and Wasp Jet Spray," along the tube and along adjacent portions of the foundation. The termites, of course, ignored this. Unexpectedly, however, numerous ground beetles became most upset and agitated, ascended to the surface, and struggled to escape. Is there a moral to this? Read on.

Many years ago, I was partner to George Ball in an expedition to Mexico, to seek carabids. The general results are gradually being published, but some curiosities merit mention. Once, near Valle Nacional, Oaxaca, I was privileged to watch the activity at the head of an army ant column paralleling the roadway. The ants drove potential victims, and I secured a depressingly small sample of beetles, mostly agonines, driven into plain sight along the road. Later, it emerged that George, with far more work, could also count the results of the day's work on his fingers. Yet, there obviously were beetles in this mostly perpendicular, difficult to sample environment.

Another stunt George and I did was in Chiapas. We found an abandoned and litter-filled concrete water trough, which we decided first to carefully examine by hand and then to submit residual litter to a careful washing as a test of overall collecting efficiency. We found our general collecting not too good, with some of even the biggest beetles being overlooked. Read on.

Several years ago, I found that a similar washing technique used in small woodland pools near home, in Maryland, became really productive only when at least an hour was spent on each batch of litter. It was only then that the really interesting beetles, particularly certain *Clivina*, would let loose and surface. Just two years ago, I found in a rather grubby piece of woods hardly a mile from home the second known specimen of a new species of *Clivina*; no others were to be had, despite the stimulus to do diligent search. A year later, Howard Frank and I tried the washing technique on some litter – both leaf litter and otherwise – from this site, and we were rewarded with one more specimen. Wow. These are pretty sluggish beetles, yet I wonder how they might respond to suitable stimulus. Read on.

My friend, Terry Erwin, is engaged in canopy fogging operations, using knockdown insecticides, to sample tree-top beetles. Most interesting; I hope to use these techniques too, in future studies. But, why point the foggers straight up? Why not straight down? For many of us, down is where the interesting stuff is. I suspect that litter-dwelling beetles in all of the situations cited above would have responded admirably to chemical stimulus. Try it. You might like it.

– D. R. W.

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